

What is claimed is:

1. A method of identifying cells expressing a preselected molecule comprising the steps of:
 - providing a plurality of cells at least some of which express the preselected molecule;
 - providing a plurality of silica-coated nanoparticles coated with a functional group that binds to the preselected molecule, each of said nanoparticles comprising a core and a silica shell;
 - mixing the plurality of silica-coated nanoparticles with the plurality of cells to form a mixture;
 - placing the mixture under conditions that allow the nanoparticles to bind to cells expressing the preselected molecule; and
 - analyzing the cells for bound nanoparticles.
2. The method of claim 1, wherein silica-coated nanoparticles are fluorescent.
3. The method of claim 1, wherein the plurality of nanoparticles have a mean size of less than 1 micron.
4. The method of claim 1, wherein the nanoparticles have a mean size between 1 nm and 300 nm.
5. The method of claim 1, wherein the nanoparticles have a mean size between 2 nm and 10 nm.
6. The method of claim 1, wherein the core is magnetic.

- 1 7. The method of claim 6, wherein the core comprises a metal selected from the
2 group consisting of magnetite, maghemite, and greigite.
- 1 8. The method of claim 1, wherein the core comprises a pigment.
- 1 9. The method of claim 8, wherein the pigment is an inorganic salt selected from the
2 group consisting of: potassium permanganate, potassium dichromate, nickel sulfate, cobalt-
3 chloride, iron(III) chloride, and copper nitrate.
- 1 10. The method of claim 1, wherein the core comprises a dye selected from the group
2 consisting of Ru/Bpy and Eu/Bpy.
- 1 11. The method of claim 1, wherein the core comprises a metal selected from the
2 group consisting of Ag and Cd.
- 1 12. The method of claim 1, wherein the functional group is a protein.
- 1 13. The method of claim 12, wherein the functional group is an antibody that
2 specifically binds to the preselected molecule.
- 1 14. The method of claim 13, wherein the core comprises a metal selected from the
2 group consisting of magnetite, maghemite, and greigite.
- 1 15. The method of claim 1, wherein the functional group is a nucleic acid.
- 1 16. The method of claim 1, wherein the functional group is a substance selected from
2 the group consisting of biotin and streptavidin.

